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DEFENSE EXPANSION CAPABILITY: TESTIMONY BEFORE THE U.S. SENATE --ETC(U)

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SENATE COMMITTEE ON THE BUDGET, MARCH 3, 1980

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May 1980

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DEFENSE EXPANSION CAPABILITY: TESTIMONY BEFORE THE U.S.
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Mr. Chairman and members of the Committee, I appreciate the opportunity to come before you to discuss important issues relating to defense expansion capability. Though some of the information I want to share with you is based on Rand Corporation research, I am here as an individual whose opinions are my own and not necessarily shared by Rand or any of its research sponsors.

After several post-Vietnam years of declining real expenditures for defense production, there appears to be an emerging consensus that this trend should be reversed. Still to be finally resolved are questions of how much to spend, what to buy, and over what time period. As debate on these questions continues, it is also necessary to consider how quickly and efficiently industry will be able to respond to increased demands for defense-related products. In fact, the issue of defense industrial expansion capability is already receiving considerable attention,* and interest in the topic is not new.

In 1976, the Air Force Deputy Chief of Staff for Research and Development asked The Rand Corporation to undertake an investigation of defense industrial capability. Specifically, he asked us to investigate the hypothesis that post-Vietnam reductions in expenditures for military hardware, together with certain supposedly perverse characteristics of defense business (low profitability, for example) were eroding the lower tiers--the subcontractor and supplier portion--of the defense industrial base. As a consequence of this so-called erosion, defense buyers were said to be having trouble getting adequate supplies of some products, to be paying monopoly prices for others, and to be in a position of extreme risk should demand accelerate in a crisis.

Fears about this possible erosion of the industrial base were most common with respect to the so-called *lower tiers*--those segments of

* See, for example, "The Defense Production Gap: Why the U.S. Can't Rearm Fast," *Business Week*, February 4, 1980; Fred Charles Iklé, "Could We Mobilize Industry?" *The Wall Street Journal*, December 26, 1979, and Fred Charles Iklé, "Defense: \$1 Trillion," *New York Times*, February 5, 1980.

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industry that participate in defense business *indirectly* as subcontractors and suppliers, and thus are usually not counted among the major defense-oriented corporations in the United States. Concern about the lower tiers rather than the prime contractors was at least partly a consequence of evidence that there was considerable extra capacity in most prime contractor sectors.*

Over an approximately two-year period we investigated the erosion hypothesis, first addressing the question of the adequacy of the industrial base to support the Air Force's then current menu of peacetime requirements. Then, early in 1977 we turned our attention to the issue of surge capability--by our definition, the capability of these lower tiers to increase their production of defense-related products in the fairly short run--no more than a year--under conditions that would probably involve some perception of urgency or crisis but would not be severe enough to result in a declaration of war or national emergency. The results of these studies have been published and otherwise widely shared with the Air Force and other defense agencies.**

It is obvious that the quantitative results of such analysis do not remain valid forever. Indeed, much has changed in the economy as a whole and aerospace business in particular since we made our mid-1977 assessment of surge capability. Notwithstanding the passage of time I believe that some insights we gained will be useful to the Committee as it considers the issues of current defense expansion potential and how to most quickly and efficiently exploit the resources of U.S. industry to meet our

*See, for example, the *Joint Department of Defense/Office of Management and Budget Aircraft Industry Capability Study*, DW77-1, January 1977.

**See Geneese G. Baumbusch and Alvin J. Harman, *Peacetime Adequacy of the Lower Tiers of the Defense Industrial Base*, R-2184/1-AF, November 1977; Geneese G. Baumbusch and Alvin J. Harman with David Dreyfuss and Arturo Gandara, *Appendixes to the Report on the Peacetime Adequacy of the Lower Tiers of the Defense Industrial Base: Case Studies of Major Systems*, R-2184/2-AF, November 1977; Geneese G. Baumbusch, Patricia D. Fleischauer, Alvin J. Harman, and Michael D. Miller, *Defense Industrial Planning for a Surge in Military Demand*, R-2360-AF, September 1978; and M. D. Miller, *Measuring Industrial Adequacy for a Surge in Military Demand: An Input-Output Approach*, R-2281-AF, September 1978.

defense requirements. Thus, in the next few minutes I will briefly summarize the findings of our studies of *peacetime adequacy* and *surge capability* and then conclude with a discussion of steps that should be taken by DoD buyers to increase the probability that the industrial base will be able to respond to additional demands in a timely and cost-effective fashion.

1976 ASSESSMENT OF PEACETIME ADEQUACY OF THE DEFENSE INDUSTRIAL BASE

Our goal for the peacetime adequacy phase of the industrial base research was to conduct a reasonably broad inquiry into the problem of possible erosion of the lower tiers. Given time and resource limitations, we wanted to structure our research design so as to ensure maximum breadth of investigation, even though we recognized that this would lead to a sacrifice of depth of analysis in some cases. Also, we wanted to avoid any approach to information gathering (such as in-depth examination of one or two industries in which "erosion" was believed to have occurred) that might lead to a distorted perspective on the general condition of the lower tiers of the defense industrial base.

For these reasons, we decided to conduct a survey of ongoing Air Force major system acquisition programs.* We attempted to determine whether their prime contractors were encountering problems getting or keeping suppliers, and if so, why. Our investigation led us to reject the erosion hypothesis: The Air Force could almost always get qualified suppliers. Individual supplier "problems" encountered in the acquisition programs we surveyed were most often the consequence of the uncertainties of working with new technology. Where the number of suppliers of particular products had been reduced in the recent past, this shrinkage was usually attributable to a decline in the amount of business available rather than to perverse government contracting practices. At least it was not usually attributable to those practices (i.e., forcing firms into bankruptcy by not paying a reasonable price for products) most often mentioned by proponents of the erosion hypothesis. However, our analysis also indicated that the DoD could probably get more suppliers and lower-priced products if certain

* Our survey covered thirteen aircraft, missile, and communication satellite programs involving about \$32 billion of RDT&E and procurement expenditures.

characteristics of its behavior as a buyer did not effectively limit the number of firms willing or able to do its business. I will return to this point in a moment.

1977 ASSESSMENT OF SURGE CAPABILITY OF THE DEFENSE INDUSTRIAL BASE

Research Methodology

Before we could measure the capability of the supply side of the defense marketplace, we needed some information about the likely nature of demand. Would a future surge be more likely to result from indirect involvement in the style of the 1973 Mideast war, direct participation in a fairly moderate, conventional war in Asia, an intense conventional war in Europe, or some pre-conflict buildup? When we began our research, there was considerable discussion of these issues in DoD and enough disagreement that we were never provided with any specific demand estimates. In the absence of specifics, we determined to take a generalized approach, the results of which could be extrapolated to any number of specific cases. We therefore defined surge as being a 100 percent increase over a one-year period in purchases of all products in what we characterized as the three main categories of war-fighting equipment--Munitions, Spares and Replacements, and Whole Systems. We then set about trying to understand how the economy functions to manufacture products in these three categories.

To achieve this understanding, we chose the methodology of input-output analysis, which allows us to determine, for every dollar's worth of product delivered to ultimate users, what inputs are required (in dollars) from all links in the production chain of that particular product. Using a 367-sector breakdown of industry done by the Bureau of Economic Analysis of the Department of Commerce, we identified 13 sectors as being the primary manufacturers of products in the three categories of war-fighting equipment, and we identified another 86 sectors as being the important lower-tier suppliers of these 13 critical defense sectors. Our main purpose was to see what effect additional demands would have on these 13 sectors and on the 86 lower-tier sectors.

We then used the technique of input-output analysis assuming 100 percent increases in demand on each of the individual 13 critical defense sectors, on all sectors constituting each of the three defense groups, and on all 13 sectors at once.* The results enabled us to determine which sectors of industry would have to increase their total output by the largest percentage and therefore might be thought of as potentially vulnerable in a surge situation. A comparison of the increases required with Census Bureau data on capacity utilization in the relevant industries indicated that these industries should be able to reach the additional levels of production required. However, such an analysis provides only a very crude evaluation of the feasibility of industrial surge, because it is based on the questionable assumption that all unused capacity could be directed to defense production, and it provides no information about the operation of industry at the firm level.

The kinds of data necessary to make more accurate estimates of industrial capability are often not available from public sources or become out of date very quickly; we therefore tested a method of information gathering that DoD could employ to evaluate productive capabilities in any industries determined to be potentially critical. We devised a survey instrument and attempted to test it on all firms that we could identify as being members of each of three industries--nonferrous forgings, optical instruments and lenses, and semiconductors and related devices--selected as targets for our prototype effort.** We selected these industries because of their potential vulnerability as indicated in the input-output analysis and because they represented a variety of products, manufacturing processes, degrees of involvement in defense production, etc.

We tried to structure our survey to yield useful information about (1) general firm operating conditions that would help us understand

*The base year was 1975, the most recent year for which defense purchase data were available.

**A total of 446 firms were solicited; about 75 returned completed questionnaires. Together these 75 firms produced about 1.8 billion dollars worth of the 3 products in 1976.

the particular industry and that would provide a cross-check on the plausibility of estimates of surge increases, (2) how much and by what means current defense producers could increase production in response to surge demand, (3) whether noncurrent DoD producers would participate in surge, and (4) the deterrents or impediments (an indirect measure of cost) to both groups in attempting surge production. Basically, we designed the questionnaire to provide information that would enable us to answer what we believed to be the three critical questions regarding industry's ability to surge production--how much? how? and what would be the most serious problem?

Research Results

The results of our prototype data collection efforts, conducted in mid-1977, indicated that current defense producers in all three industries could significantly increase defense-related output within 180 days of the levying of surge requirements. Even in as short a period as 90 days, firms estimated that they could produce about 50 percent more than they had during a similar period in 1976. By the end of that defined one-year period, firms in all three industries would be producing at about double 1976 levels. Although we did not get quantitative estimates of the possible contributions of firms not currently doing defense business, we posed qualitative questions to them, and firms in all three industries indicated a willingness and ability to participate in DoD surge production. However, such participation was not anticipated to be very extensive before at least 180 days had elapsed.

Firms currently doing defense business reported that they would rely most heavily on additional labor to increase production for surge but that better or different use of existing equipment and some purchase of new equipment once surge was under way would be important too. Although these results varied somewhat from industry to industry (e.g., nonferrous forgers then had a much lower percentage of equipment in use than the other two and therefore would have relied more heavily on existing equipment), they were remarkably similar in conveying the simple message that availability of inputs to the production process would be the critical factor in determining the extent of surge production. To the extent that

any of these inputs are difficult or impossible to provide for in advance (e.g., skilled labor), expensive efforts to provide reserves of such other inputs as equipment and facilities are not likely to be very effective.

Responses concerning the deterrents and impediments to surge further emphasized the importance of needed input availability. Current defense producers often cited availability of labor, equipment and tooling, and materials as possible impediments to surge, and noncurrent producers indicated similar concerns--particularly about being able to recruit skilled labor on a potentially temporary basis. As would be expected, noncurrent defense producers expressed more concern about specialized military production requirements than did current defense producers, but many current producers also suggested that requirements for specialized production processes and testing and quality control would be an obstacle to their meeting surge requirements.

IMPLICATIONS FOR THE '80s

Our analyses led us to make a series of recommendations for what DoD and other participants in the procurement process should do to increase the efficiency of that process under normal conditions and to increase potential expansion capability and minimize potential surge costs. Though I suspect we might get different quantitative estimates of reserve capacity today than we did three years ago, I believe the major policy implications of our work remain unchanged and that acting on them now is particularly necessary given current economic conditions and national security requirements. Let me highlight some of the specifics.

A critical first policy goal for the DoD is to find ways to lower barriers to entry into the defense marketplace. The more diversity there is in the marketplace, the more likely it is that unforeseen and unforeseeable circumstances will cause tremors rather than major quakes. It is important to find ways to make the defense market a place that firms can move into fairly easily when demand is high but not become so dependent upon that they become a burden on DoD's scarce resources

when demand is not as great. One of the ways to lower barriers to entry is to try to find ways to make defense business less distinguishable from other types of business, both in an administrative and in a substantive sense. Despite the fact that weapon systems are, of necessity, highly specialized products, our research offered sufficient evidence to support the proposition that specialization is overdone. This is particularly true as far as the administrative portion of the specialized buying practices is concerned. Here I am specifically referring to administrative requirements levied by DoD and related to production and management practices--requirements for inspection, quality control, documentation, etc. In the last four years, our study, two others undertaken or commissioned by DoD, and one by the GAO all have concluded that these defense contract administrative activities are often ineffective, unnecessarily duplicative of contractor efforts, and generally overdone. Reducing some of this administrative burden might entice some firms with a distaste for "red tape" into the defense marketplace, shorten the response time of those already doing defense business, and save money.

There may also be possibilities for reducing some of the other specialized requirements as well. An example comes from information provided by current defense producers in the nonferrous forgings industry in response to our surge capability survey. In this industry, production process times for defense products can be very long, with a significant part of this time being devoted to various testing and quality control procedures. In 1977, firms participating in our survey indicated that about five or six weeks' worth of those procedures were new requirements levied since the end of the Vietnam war. Industry representatives questioned whether the benefits of these requirements were really worth their costs in time and money. Current conditions make it reasonable to ask this question again--and to look carefully for requirements that could be eliminated or modified to increase industrial responsiveness.

A more fundamental concern about product specialization arises from the trend over the last two or three decades toward buying increasingly expensive and technically sophisticated pieces of equipment. In its recent report on the possibilities for reducing weapon system costs, the GAO cites examples of the dramatic real increases in unit costs of various types of equipment over the last twenty or thirty years.* While acknowledging that these increasingly expensive pieces of equipment are individually more capable than their cheaper predecessors, GAO wonders whether the eventual procurement of smaller quantities due to high unit cost will not have a deleterious effect on our overall military capability.

There is no magic formula for determining the proper relationship between cost, quantity, and quality. Whatever the merits of the respective cases in the debate, preference for the upper end of the technology spectrum has some clear implications for industry. First, relatively few firms will have the necessary capabilities, and even those that do will encounter unforeseen difficulties. Technical trouble of one sort or another was at the root of nearly every instance of supplier problem in our peacetime adequacy survey. In addition to the vendor problems *Business Week* cites as causes for impending shortages of F100 engines, that program has been plagued by unanticipated repair and replacement requirements growing out of severe reliability problems--problems that are unfortunately typical of developments characterized by high levels of technical advance.

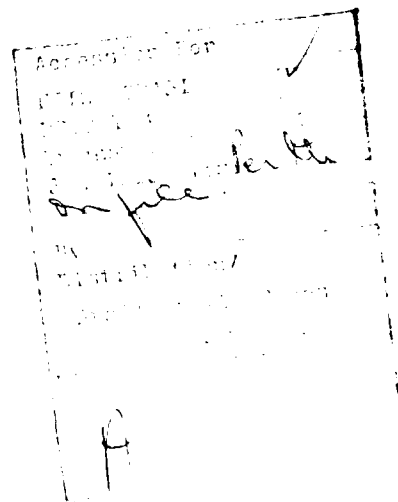
Significant variations in the cost/quality/quantity relationship will take time and careful consideration. In the meantime, I believe that even given our current menu of weapon systems, the major issue with regard to competition and diversity in the industrial base is not the willingness or ability of suppliers to provide it, but rather the extent to which the buyer acts (perhaps inadvertently) to limit it. Requiring unnecessarily specialized products, production processes, or administrative procedures is one aspect of this problem, but another equally important element is the need for DoD buyers to take a more active role to encourage and maintain competition in R&D and production of weapon systems. Our investigation of

* *Impediments to Reducing the Costs of Weapon Systems*, General Accounting Office, November 8, 1979.

the thirteen programs in the peacetime adequacy portion of our research yielded several cases where maintenance of more than one source in R&D or production yielded substantial price reductions and important insurance against program disruption due to technical difficulties encountered by a single supplier. Currently there seems to be progress being made in this area with DoD and the Air Force in particular displaying increased enthusiasm for competition.

A second policy goal for DoD should be the development of an analytical capability to help policymakers understand better how industrial activity supports defense requirements. Such an understanding is necessary to the development of policies aimed at increasing the efficiency of defense production under normal conditions and reducing the risks of shortages in time of crisis. The methodology we tested in our surge capability study could be used quite inexpensively by DoD to fill the analytical vacuum that currently exists.

In summary, I believe there are some steps defense buyers can take now to help them cope better with current conditions in the marketplace. In addition, DoD could improve its future prospects by developing an analytical capability to provide policymakers with a better understanding of defense industrial activity. Some changes may be institutionally difficult since they will require varying from established practice. But change is essential to increase industrial responsiveness and overall efficiency in defense procurement.



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